CLAIMS

1. A roller device (100-180) for displacing a load (1) in a generally horizontal plane between a load handling apparatus with forks and a machine (20), said device being designed to equip the forks (10) of said handling device and comprising at least one rail (310) defining at least one plane contact surface (S) capable of supporting said load (1) when it is static, said rail (310) being hollow, generally horizontal, and provided with a longitudinal opening (320), at least one counter-rail (210) housed inside said rail (310) and inside of which the roller elements (230) are attached opposite said longitudinal opening (320), said roller elements (230) being located in a plane that is generally parallel to said surface (S) and capable of supporting said load (1) when it is moving, at least one of said structures (310 or 210) being connected to an actuating means (400, 400', 600-1000) so as to be movable relative to the other between at least one lower position and one upper position, in which positions the load is supported either by the rail (310) or by the counter-rail (210), said actuation means being disposed to displace the structure called the movable structure (310 or 210) in at least horizontal translation (Th), with lifting means (500, 500') being disposed between the two structures (210, 310) to cause the structure known as the movable structure to move in vertical displacement (Tv) simultaneously with its horizontal displacement (Th), characterized in that the actuating means (400, 400', 610-1100) comprises at least one block (450, 20', 650-1150) designed to be attached to said machine (20) and at least one actuator (410, 410', 610-

1110) disposed between the two structures (210, 310) and designed to cooperate with said block and to transform a vertical force exerted by said block on said actuator into a horizontal force exerted by said actuator on the structure known as the movable structure (310 or 210) to displace it in horizontal translation (Th) when the forks (10) on the load handling apparatus are connected to said machine (20).

2. A device (100-130), 150-180) according to claim 1 characterized in that said lifting means (500) comprises inclined ramps (331) integral with said rail (310) designed to cooperate with said roller elements (230) on said counter-rail (210).

3. A device according to claim 2 characterized in that said inclined ramps (331) define at least a first zone (331a) designed to allow at least the tops of the roller element (230) to project, a second zone (331b) designed to cover the roller elements (230), and an intermediate zone (331c) forming, in combination with the roller elements, the lifting ramps.

4. A device according to claim 3 characterized in that each roller element comprises at least one roller (230) designed to support said load (1) in the moving position, said roller (230) being attached to a generally horizontal axle (220) between two rollers (240) of smaller diameter, said rollers (240) being in contact with said inclined ramps (331).

5. A device (140) according to claim 1 characterized in that said elevation means (500') comprises articulated bearings (510) having one extremity connected to said rail (310) and the other extremity connected to said counter-rail (210).

6. A device according to claim 1 characterized in that said actuator is chosen from the group comprising at least a pivoting lever (410, 410'), a ball and socket(710), a rotating element (610), or a cylinder (810, 910).

7. A device according to claim 1 characterized in that said rail (310) is fixed and said counter-rail (210) supporting said roller elements (230) is movable and cooperates with said actuator (410, 410', 610-1110), said actuator being designed to displace said counter-rail (210) from the lower position to the upper position when it is in contact with said block (450, 20', 650-1150) and to allow said counter-rail (210) to descend into the lower position by gravity when it is no longer in contact with said block.

8. A device (100) according to claim 7 characterized in that the actuator comprises at lest one pivoting lever (410) attached to said rail (310) by an axle (420) oriented in a generally perpendicular direction to the direction of horizontal displacement (Th) of the counter-rail (210), said pivoting lever (410) comprising at least two contact zones (430, 440) located on either side of said axle (420), one of which (440) is in contact with the counter-rail (210) and the other of which (430) is designed to cooperate with said block (450).

9. A device according to claim 8 characterized in that said pivoting lever (410) comprises at least one roller (230) located between the two contact zones (430, 440) and designed to complement the roller elements (230) on said counter-rail (210) when it is in the upper position.

10. A device (110) according to claim 7 characterized in that the actuator comprises at least one pivoting lever (410') attached to said counter-rail (210) by an axle (420') oriented in a generally perpendicular direction to the direction of horizontal displacement (Th) by the counter-rail (210), said pivoting lever (410) comprising at least two contact zones (430', 440'), one of which (440') is in contact with the rail (310) and the other of which (430') is designed to cooperate with said block

11. A device according to claim 10 characterized in that the contact zone (440') consists of a travel ramp capable of cooperating with a rotating element (441') integral with said rail (310).

12. A device (120) according to claim 7 characterized in that the actuator comprises at least one rotating element (610) attached to said counter-rail (210) by an axle oriented in a generally perpendicular direction to the direction of horizontal displacement (Th) of the counter-rail), said rotating element (610) being designed to move along an inclined ramp (620) integrated within said block (650), said rail (310) being guided in vertical translation within said block (650) by a tenon (630) and slide (640) system.

13. A device (130, 140) according to claim 7 characterized in that the actuator

comprises at least one ball and socket (710) consisting of at least one contact zone (720) disposed at the intersection of two articulated lever arms (730) respectively connected to said rail (310) and to said counter-rail (210) along axles that are generally perpendicular to the horizontal displacement (Th) of said counter-rail (210), said contact zone (710) being designed to cooperate with said block (750).

14. A device according to claim 8, 10 or 13 characterized in that said contact zones (430, 440, 430', 720) consist of rotating elements.

15. A device (150, 160) according to claim 7 characterized in that the actuator comprises at least one double cylinder (810, 910), a first piston (840, 940) of which cooperates with said counter-rail (210) and is generally parallel to its horizontal displacement (Th), and the second (820, 920) of which is designed to cooperate with said block (850, 950) and is generally perpendicular relative to the first piston (840, 940).

16. A device according to claim 15 characterized in that the second piston (820, 920) is associated with a recall means (830, 930).

17. A device (160) according to claim 15 characterized in that the chambers (911, 913) of the pistons (920, 940) are separate and interconnected by at least one conduit (912) housed in said rail (310).

18. A device (170, 180) according to claim 7 characterized in that the actuator comprises at least one rotating element (1010, 1110) attached to said rail (310) by an axle (1011, 1111) oriented generally perpendicular to the horizontal displacement (Th) of said

counter-rail (210) and guided in translation within said rail (310) by grooves (1021, 1121), said rotating element (1010, 1110) being designed to cooperate with two ramps (1020, 211; 311, 1120) provided on the rail (310) and the counter-rail (210), respectively, at least one of said ramps (1020, 1120) being inclined.

19. A device according to claim 18 characterized in that said rotating element (1010, 1110) comprises at least three coaxial rollers (1012, 1013, 1014; 1112, 1113, 1114) of different diameters, at least two of which are movable in relation to each other, said rollers being designed to respectively cooperate with the ramp (1021, 311) integral with the rail (310), the ramp (211, 1120) integral with the counter-rail (210), and the block (1050, 1150).

20. A device according to claim 1 characterized in that said block is selected from among at least a tie rod (450, 650-1150) capable of receiving the front extremity of said forks (10) and a machine table (10'), and is at least partially shaped to be compatible with said actuator (410, 410', 610-1110).

21. A load handling device with forks for displacing a load (1) in a generally horizontal plane between said load handling device and a machine (20), characterized in that its forks (10) comprise said roller device (100-180) according to any one of the preceding claims.